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ABSTRACT

In early 1994, Central Falls, Rhode Island's Kids First, a collaborative partnership between the Central Falls School Department and local community leaders, launched a pilot universally-free school breakfast program (UF-SBP) called "Operation Breakfast." One of the goals of Operation Breakfast was to improve SBP participation; school breakfast was made available to all children in the school district free of charge. A "rapid assessment" evaluation was conducted. The evaluation was designed to determine within a short period of time, using limited resources, and with minimum disruption of school activities and routines, how Operation Breakfast affected program participation and children's preparedness for school. Major findings of this evaluation were: (1) UF-SBP leads to significant increases in breakfast program participation; (2) UF-SBP increases participation most among nutritionally vulnerable and impoverished students; (3) UF-SBP led to significantly lower rates of tardiness and absence among participants; (4) fewer children entered their classrooms without having eaten any breakfast; (5) the breakfasts eaten by children who participate in the SBP consist of more nutritious foods and foods that are lower in fat and sugar content than breakfast foods eaten by non-participants; and (6) nutrient intakes of children in Central Falls schools who participate in the SBP are significantly better than the nutrient intakes of children who do not participate in the SBP. (An appendix details the study's methodology.) (EV)

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Evaluation of a Universally-Free School Breakfast Program Demonstration Project

Central Falls, Rhode Island

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Central Falls, Rhode Island

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January 1996

FOREWORD

The national School Breakfast Program was initiated by the Child Nutrition Act of 1966 to remedy a problem that undermined educational success. Many children were arriving at school poorly prepared to learn because they had not eaten breakfast. By providing nutritious breakfast to low-income children, and children who had to travel long distances to school, the School Breakfast Program helps to safeguard the nation's investment in the education of children and their futures. The threat of undernutrition among school-age children has worsened in recent years. Millions of American children arrive at their classrooms without adequate nourishment to carry out the tasks of learning and preparing for productive lives as adults.

In Central Falls, RI a unique community-focused partnership developed around concern for the nutritional well-being of its children. This partnership among community organizations, parents, educators, and city officials led to Central Falls' Kids First, an initiative aimed at reducing hunger and improving nutritional well-being among children in Central Falls. One element of Kids First involved changing the School Breakfast Program in the city's schools to a universally-free program, available to all children at no cost, to eliminate any stigma associated with participation in the program.

This evaluation was designed to determine whether the change to a universally-free School Breakfast Program was beneficial to Central Falls' children. Careful analysis of the data indicates that the changes in the program were highly beneficial.

A large and growing body of scientific evidence strongly indicates that proper nutrition is extremely important in terms of cognitive development, academic achievement and later workforce productivity. Children who experience chronic hunger and nutrient inadequacies are not able to learn effectively and, therefore, to acquire the knowledge and skills they must have to function successfully in the workforce and economy of the twenty-first century.

The national School Breakfast Program has been shown to provide a significant measure of insurance against hunger and undernutrition for America's school children. Compared to the very large losses the nation suffers on its educational investments when children arrive at school nutritionally unprepared for the learning process, the costs of the School Breakfast Program are minimal. Providing breakfast on a universally-free model in key school districts can further strengthen the effectiveness of this vital program.

J. Larry Brown, Director
Center on Hunger, Poverty and Nutrition Policy
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INTRODUCTION

The Operation Breakfast Project

Central Falls, RI is a densely populated city with high rates of poverty. Though the School Breakfast Program (SBP) has been available throughout the school district for several years, in 1992-93 only 14 percent of students eligible for free or reduced-price meals participated in the program. In early 1994, Central Falls' Kids First, a collaborative partnership between the Central Falls School Department and local community leaders, launched a pilot universally-free school breakfast program (UF-SBP) called "Operation Breakfast." One of the goals of Operation Breakfast was to improve SBP participation. Under the UF-SBP, school breakfast was made available to all children in the school district free of charge.[1]

USDA research shows that in 1993 just under 20 percent of students to whom the SBP is available participate in it (1, p. 13). Other studies suggest several factors associated with low breakfast consumption and participation in the SBP nationwide (1, 4, 7). Among these are employment status and educational level of mothers.

Operation Breakfast's objectives included informing parents and teachers about the nutritional benefits of school breakfast, encouraging students to try school breakfast, and making participation in school breakfast fun. Special promotional activities included Parent/Teacher Breakfasts, Breakfast in the Classroom, the Breakfast Club and promotional fliers and contests with free gifts and prizes to participants.

A "rapid assessment" evaluation component was included in the implementation of Operation Breakfast to determine, within a short period of time, using limited resources, and with minimum disruption of school activities and routines, how the promotion affected program participation and children's preparedness for school (e.g., school attendance, tardiness, and food and nutrient intake in the morning). A detailed description of the evaluation study design is presented in the Appendix to this report.

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[1] In schools where the proportion of students eligible for free or reduced-price meals is stable it can be advantageous for schools to apply for and receive "Provision II" status. This provision allows schools to verify eligibility status for students receiving subsidized meals every third consecutive year, instead of annually. This can significantly reduce administrative costs. Central Falls school administrators did not apply for Provision II status.

MAJOR FINDINGS

The universally-free School Breakfast Program (UF-SBP) leads to significant increases in program participation.

* Based on single-day measures taken on the day of survey, participation in the School Breakfast Program (SBP) increased nearly 60 percent more among Central Falls students than among the control group students after implementation of the UF-SBP in Central Falls schools (by 17.5 percentage points, compared to 11.0 percentage points - see Figure 1).

* Based on 30-day measures, after the program became universally free a significantly larger proportion of Central Falls students were categorized as "frequent" participants (i.e., more than 30 percent of enrolled school days) as opposed to "infrequent" participants.

The UF-SBP increases participation most among nutritionally vulnerable and impoverished students.

* The proportion of children in poor families (below 130 percent of poverty) participating in the SBP increased 71 percent more in Central Falls schools than in the control group schools (by 18.1 percentage points, compared to 10.6 percentage points - see Figure 1) after the SBP became universally free.

* The increase in SBP participation rates was significantly greater among poor students in the Central Falls schools than among nonpoor children, while control group differences by poverty status were not significant.

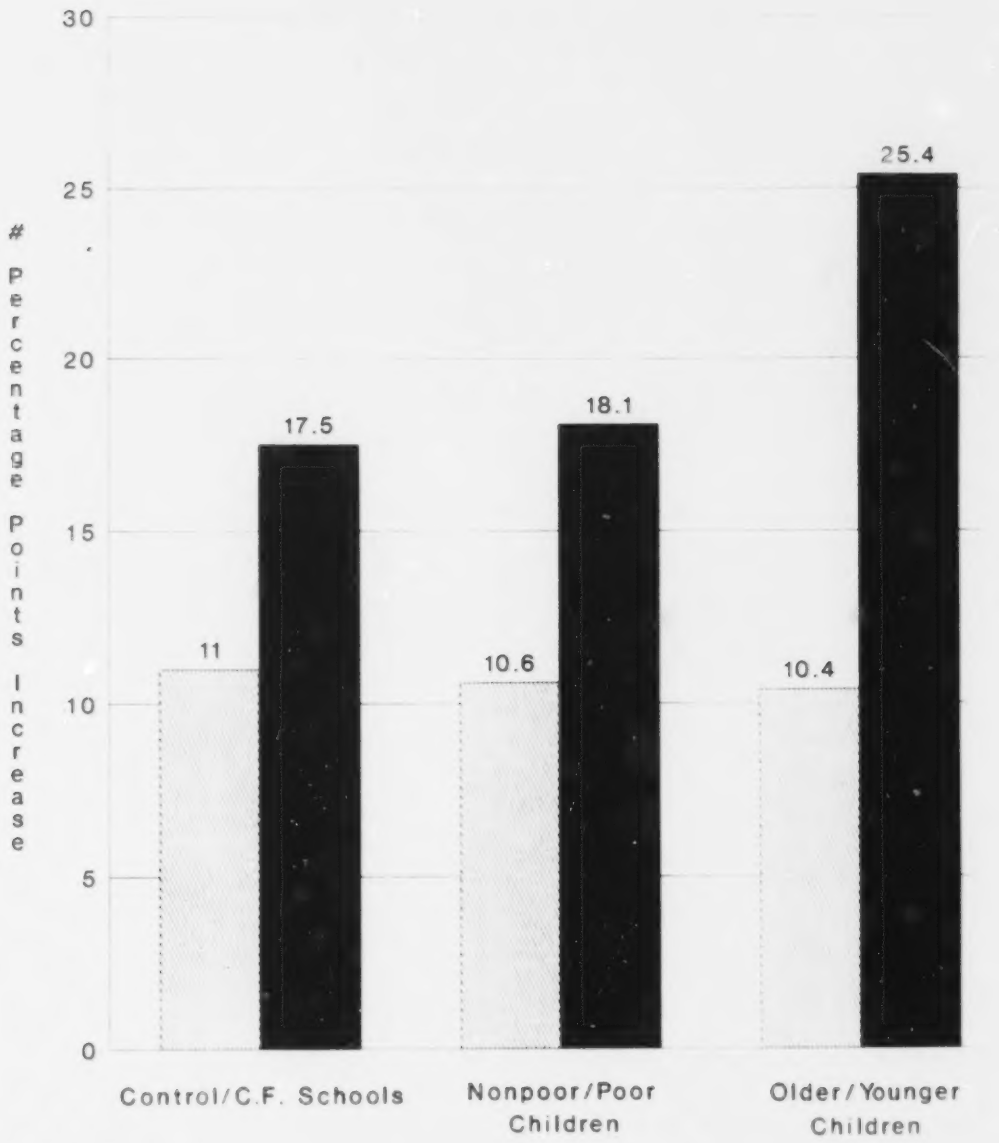
> *This significantly greater increase in participation among poor children is critical since it indicates that participation increased most among students in greatest need of nutrition assistance.*

- Using single-day measures, the proportion of very young children (children in grades K through 2) participating in the SBP increased by 110 percent more in universally-free schools than in control-group schools (25.4 percentage points, compared to 12.1 percentage points).

- Within universally-free schools, the increase in single-day SBP participation rates among children in grades K-2 was 144 percent greater than the increase among children in grades 3-6 (25.4 percentage points versus 10.4 percentage points - see Figure 1), while control group differences by age were not significant.

> ***This 144 percent difference is especially important since it indicates that participation increased most among Central Falls students who were youngest, and thus at greatest risk of poverty-related educational and developmental problems.***

Figure 1: Impact of Universally-Free School Breakfast on Participation Rates: Overall, By Poverty Status and Age



Source: Center on Hunger, Poverty and Nutrition Policy

The UF-SBP led to significantly lower rates of tardiness and absence among participants.

- A significantly larger decline occurred in overall tardiness in Central Falls schools after implementation of the UF-SBP, than occurred in control group schools. The proportion of children chronically tardy (tardy on more than 10 percent of days) decreased by 67 percent in the universally-free schools, while actually increasing by 50 percent in control schools.

- Average rates of absence and tardiness were significantly lower for Central Falls children who were frequent participants in the SBP program (participated on more than 30 percent of enrolled days) than for infrequent participants (absence rate of 3.9 percent for frequent participants compared to 7.5 percent for infrequent participants; tardiness rate of 2.6 percent for frequent participants versus 5.1 percent for infrequent participants).

- Moreover, in Central Falls schools, the proportion of frequent SBP participants (those participating more than 30 percent of enrolled days) who were chronically tardy (tardy on more than 10 percent of enrolled days) was significantly smaller than the proportion of infrequent participants chronically tardy (5 percent of frequent participants, versus 12 percent of infrequent participants).

The UF-SBP led to fewer children entering their classrooms without having eaten any breakfast.

* The proportion of students in Central Falls schools who entered their classrooms without eating any breakfast at all was reduced by 36 percent (from 11.2 to 7.2 percent) after implementation of the UF-SBP.

The breakfasts eaten by children who participate in the SBP are comprised of more nutritious foods, and foods that are lower in fat and sugar content than breakfast foods eaten by nonparticipants.[2]

* Children from Central Falls schools who eat breakfast at school consume milk products, fortified grain products and fruit juices significantly more often than children who eat breakfast only at home.

* Children in Central Falls schools who eat breakfast at home consume "junk food" about 18 percent of the time, and foods high in fats and sugars about 17 percent of the time, whereas children who eat breakfast only at school do not consume these foods at all for breakfast.

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[2] Children were classified on the basis of whether they ate breakfast only at home, only at school (in the SBP), or in both places. For the food consumption and nutrient intake analysis children who ate breakfast at home and at school were considered participants in the SBP.

Nutrient intakes of children in Central Falls schools who participate in the SBP are significantly better than the nutrient intakes of children who do not participate in the SBP.[3]

* SBP participants have significantly higher intakes of seven out of nine nutrients examined than nonparticipants (food energy, protein, fat, vitamin A, calcium, iron, vitamin B6).[4] Average intakes of these seven nutrients were from 26 to 166 percent higher among participants than nonparticipants.

* Children who eat breakfast only at school have significantly higher average intakes of four critical nutrients (vitamin A, calcium, iron and vitamin B6) than children who eat breakfast only at home.

* Significantly fewer children who participate in the SBP have inadequate intakes of four out of five critical nutrients examined (vitamin A, calcium, iron and vitamin B6) than nonparticipants. The proportion of participants with inadequate intakes of these four nutrients were 63 to 69 percent lower than the proportions of nonparticipants.

* Significantly fewer children who eat breakfast only at school have inadequate intakes of four out of five critical nutrients examined (vitamin A, calcium, iron and vitamin B6) than children only eating breakfast at home.

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[3] Since data on quantity of foods eaten reported by children in grades K-2 are not considered reliable, analysis of nutrient intakes only used data from children in grades 3-6. For this analysis children in grades 3-6 from both round 1 and round 2 samples were combined. SBP participants are those children who participated on the day of survey at either round.

[4] Note that even though SBP participants had a significantly higher average intake of fat, their average intake of cholesterol was much lower than for nonparticipants (48 mg for participants versus 77 mg for nonparticipants).

SUMMARY

This study assesses the impacts of changing to a universally-free School Breakfast Program (UF-SBP) in Central Falls in four key areas: i) SBP participation, ii) whether children eat breakfast at all, iii) the nutritional value of morning nutrient intakes, and iv) school tardiness and attendance.

SBP Participation

In examining whether the change to a UF-SBP had a significant influence on SBP participation, the results show that participation based on a single-day measure increased **60 percent more** in Central Falls schools than in control schools (by 17.5 percentage points versus 11.0 percentage points). When SBP participation was measured over a thirty-day period in Central Falls schools, there was a significant **increase of 66 percent** in the participation rate (from 35 percent to 58 percent) after implementation of the UF-SBP. Moreover, a significantly higher proportion (**37 percent higher**) of Central Falls children were frequent participants (participated more than 30 percent of enrolled days) in the SBP after it became universally free.

Results of this study also show that changing to a UF-SBP increases participation most among children with the greatest need of nutritional assistance, and at greatest risk of nutrition-related impairment in cognitive and physiological development. Analysis of single-day participation rates shows that participation among poor children (incomes below 130 percent of poverty) **increased 71 percent more** in Central Falls than in control schools (18.1 versus 10.6 percentage points). The proportion of very young children (in grades K-2) participating in the SBP increased by 13.3 percentage points more in Central Falls schools than in control schools (25.4 versus 12.1 percentage points).

Within Central Falls schools, the increase in participation was significantly greater (**66 percent larger increase** - by 18.1 percentage versus 12.6 percentage points) among poor children than among children in families with incomes at or above 130 percent of poverty. Moreover, the increase in SBP participation among children in grades K-2 in Central Falls schools was significantly greater than that among older children (**144 percent larger increase** - by 25.4 versus 10.4 percentage points).

Absence and Tardiness

Tardiness and absence declined significantly in both Central Falls and control schools over the study period, with the decline in tardiness for universally-free schools significantly greater than that in control schools. The difference in reduction in absence in Central Falls and control schools was not statistically significant.

Within Central Falls schools, average absence and tardiness rates were significantly lower among frequent participants (those participating in the SBP more than 30 percent of enrolled days) than for infrequent participants (children participating 30 percent of enrolled days or less). In addition, the proportion of frequent SBP participants who were chronically tardy (late on more than 10 percent of enrolled days) was significantly lower than the proportion of infrequent participants who were chronically tardy.

Whether Children Eat Breakfast

Nationwide an average of about 12.0 percent of all school children do not eat breakfast at all. Within Central Falls schools the proportion of children entering their classrooms in the morning without having eaten any breakfast **declined by 36 percent** (from 11.2 to 7.2 percent) after the change to a UF-SBP.

Nutritional Quality of Breakfast Foods

Children in Central Falls schools who eat breakfast at school are significantly more likely to eat dairy products (**22 percent more likely**), cereals, breads and fortified grain products (**28 percent more likely**), and full-strength fruit juices (**134 percent more likely**) than children who eat breakfast only at home. Also, Central Falls children who only eat breakfast at school are significantly less likely to eat candy, flavored drinks, "junk food," and foods high in fat and sugar (**no children eating only school breakfast consume these foods, while 18 percent of children eating at home do**).

Adequacy of Nutrient Intakes

Results from analysis of the nutrient content of breakfast foods consumed by children in grades 3-6 of Central Falls schools show that SBP participants have significantly higher average intakes of seven out of nine nutrients examined than nonparticipants (food energy - **26 percent higher**, protein - **34 percent higher**, fat - **31 percent higher**, vitamin A - **43 percent higher**, calcium - **79 percent higher**, iron - **166 percent higher**, and vitamin B6 - **54 percent higher**). In addition, children who eat breakfast only at school have significantly higher average intakes of four nutrients critical to healthy development and functioning (vitamin A - **35 percent higher**, calcium - **50 percent higher**, iron - **131 percent higher**, and vitamin B6 - **47 percent higher**) than children who only eat breakfast at home.

Federal standards require that SBP meals provide 25 percent of the RDAs for the most of the important nutrients. Defining inadequate breakfast nutrient intakes as less than two-thirds of this amount, results of analysis of nutrient intakes show that significantly smaller proportions of children who participate in the SBP have inadequate morning intakes of four out of six key nutrients examined (vitamin A - **67 percent smaller proportion**, calcium - **63 percent smaller**, iron - **66 percent smaller**, and vitamin B6 - **69 percent smaller**) than nonparticipants. Comparison of nutrient adequacy among children who only eat school breakfast and those who only eat breakfast at home shows that significantly fewer children who only eat school breakfast have deficient intakes of four out of these six key nutrients than children who eat breakfast only at home.

Conclusion

Results of a rapid assessment evaluation of the effects of changing from a regular SBP to a universally-free SBP in schools in Central Falls, RI show that the change led to major improvements in SBP participation, absence and tardiness rates, the proportion of children eating breakfast, quality of foods consumed for breakfast, and nutrient intakes among children participating in the SBP. Moreover, these results show that the SBP is effective in improving the nutritional well-being and educational preparedness of school-age children.

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Appendix

BACKGROUND

Nutrition and Cognition in Children

Recent research provides compelling evidence that undernutrition during early school years can have detrimental effects on the cognitive development of children and their later productivity as adults. In ways not previously known, undernutrition impacts the behavior of children, their performance in school, and their overall cognitive development (Center on Hunger, Poverty and Nutrition Policy, 1993).

The National School Breakfast Program

The national School Breakfast Program (SBP) was established by Congress in 1966 under the Child Nutrition Act as a pilot program to provide breakfast to poor children in areas where they had to travel long distances to school. Amendments to the Child Nutrition Act in 1975 authorized the SBP as a permanent program, and subsequent legislation expanded its coverage (Burghardt and Delaney, 1993).

All public and non-profit private schools and all residential child care institutions can participate in the SBP. School boards or committees must apply to their state department of education to initiate a program. Breakfast is available to all children whose institution participates in the program regardless of family income. Children in families whose income is below 130 percent of the federal poverty threshold can receive free breakfast, while children in families with incomes between 130-185 percent of the poverty level can receive reduced-price breakfast. Parents must generally return a completed standard application to the school for determination of eligibility. The same application covers both school lunch and breakfast (Food Research & Action Center (FRAC), 1993).

The U.S. Department of Agriculture (USDA) reimburses schools for breakfasts served under the SBP. In Fiscal Year 1993 the reimbursement was $0.1875 for a full-price breakfast, $0.645 for a reduced-price breakfast, and $0.945 for a free breakfast. Program regulations specify that reimbursable school breakfasts must include a serving of fluid milk, a serving of fruit or vegetable or a full-strength fruit or vegetable juice, and two servings of either bread or meat or their alternates. Each school breakfast is intended to provide approximately one-fourth of the RDA for important nutrients (Burghardt and Devaney, 1993).

The SBP is available to just over half of all students in the nation. In FY 1992 the SBP was offered in 47,627 schools and residential child care institutions. That fiscal year the average number of children participating in the program daily was approximately 4.8 million, with 4.0 million of these children receiving free breakfasts. More than 85

percent of SBP breakfasts are served to children whose family income is below 185 percent of the poverty level. The average full price paid by students for breakfast at participating schools in 1991-92 was $0.60, and the average reduced price was $0.28 (Burghardt and Devaney, 1993; FRAC, 1993).

RATIONALE FOR THE STUDY

Most recent research on the SBP has focused principally on whether the availability of the program in schools significantly influences the likelihood that students will eat breakfast, students' overall nutrient intake (Devaney and Fraker, 1989), students' performance on standardized achievement tests (Meyers and Sampson, et al., 1989), and students' tardiness and absence rates (Meyers and Sampson, et al., 1989). No studies have assessed the influence on such factors of changing from a regular SBP (R-SBP) to a universally-free program (UF-SBP).

Devaney and Fraker (1989) found that the presence of a R-SBP in schools had no significant influence on whether children in those schools ate breakfast, though availability of the program did have significant positive influence on intake of some nutrients. Meyers and Sampson, et al. (1989) found that low-income Lawrence, MA students participating in the SBP scored significantly higher on a standardized achievement test than eligible non-participating students in a control group. These researchers also found that SBP participation had significant negative influence on tardiness and absence rates.

Previous research has thus shown that participation in the SBP by low-income children can have significant favorable effects on both diet and desirable educational and social outcomes. No studies have yet been done, however, to assess the influences of changing from a R-SBP to a UF-SBP on similar factors.

STATEMENT OF THE PROBLEM

This research addresses four distinct questions regarding the effects of changing from a R-SBP to a UF-SBP in all Central Falls schools. Specifically, the research examines whether changing to a UF-SPB has significant effects on:

1. SBP participation
2. whether Central Falls school children eat breakfast at all
3. morning nutrient intake among Central Falls school children
4. school absence and tardiness

Stated as null hypotheses, these questions are:

1. $H0_1$: The change from a R-SBP to a UF-SBP has no significant effect on SBP participation in Central Falls schools.

2. $H0_2$: The change from a R-SBP to a UF-SBP has no significant effect on whether Central Falls school children eat breakfast.

3. $H0_3$: The change from a R-SBP to a UF-SBP has no significant effect on morning nutrient intake among Central Falls school children.

4. $H0_4$: The change from a R-SBP to a UF-SBP has no significant effect on absence or tardiness rates among Central Falls school children.

STUDY DESIGN

The basic design employed in this evaluative study is a nonequivalent control group design with pretest and posttest, as described in Cook and Campbell (1979, pp. 103-117). Since there is a possibility that pretest measurement could influence posttest responses in a way that could lead to incorrect inferences, separate pretest and posttest samples are used. This design is considered generally interpretable, and its use with separate randomly drawn pretest and posttest samples is the strongest context for its implementation (Cook and Campbell, 1979; p. 115).

The pretest samples were interviewed during the months of February and March 1994 (the samples and sampling procedures are described below). The posttest samples were interviewed during May 1994. The control group samples were selected from schools in the Providence, RI school district. The schools from which the control group samples were selected are similar to Central Falls schools in socioeconomic characteristics and the proportion of students eligible for free or reduced-price school lunches and breakfasts.

A modified dietary recall instrument was used to collect information about each subject's food consumption from the time they awoke until the time of the interview (see Exhibit 1 attached). All children interviewed were asked whether they had eaten anything since waking on the day of the interview. If the subject responded negatively (after appropriate probes), three additional questions were asked about the reasons for not eating, and how frequently they do not eat breakfast.

If a subject responded affirmatively to the question whether they had eaten anything, they were also asked what they ate and where the food was eaten (venue). In addition, subjects in grades 3-6 were also asked to indicate the quantity of each item eaten (using descriptions and standard food quantity models provided by the interviewers). Thus, for respondents in grades 3-6 estimates of nutrient intake during the morning of the interview were produced.

Interviewers

Interviewers were hired and trained from within the Central Falls community. At least one interviewer fluent in Spanish was available during each session. An interviewer training protocol was created for use during training and as a reference for interviewers

during the interview process. Training was conducted during the second week of February, taking approximately two days (refresher training sessions were also provided prior to post-intervention interviews). A strong preference was expressed by Central Falls school administrators for interviewers with experience in public elementary schools. Relying on recommendations from school and community service organizations, we were able to comply with this preference.

DESCRIPTION OF STUDY LOCATION AND SAMPLE

Study Location

In January 1994, the steering committee of the Central Falls "Kids First" program moved to assist the Rhode Island Department of Education's Office of School Food Service in their efforts to initiate a pilot universally-free school breakfast program in all Central Falls public schools. The committee adopted the name "Operation Breakfast" for their campaign to promote Central Falls' UF-SBP to all families in the school district.

A strong interest emerged within the Kids First steering committee in performing an evaluation of the effects the change from a R-SBP to a UF-SBP might have on SBP participation, school absenteeism and tardiness, and children's consumption of food and nutrients prior to the start of a school day. The Tufts University Center on Hunger, Poverty and Nutrition Policy was contacted and asked to design and implement an evaluative study to assess the impacts of the change to a UF-SBP.

According to the 1990 Census of Population, the total population of Central Falls was 17,637 persons, of which 28 percent were foreign born. Of the 15,972 residents of Central Falls five years old or older in 1990, 51 percent spoke a language other than English at home. Of those residents who spoke a language other than English at home, 51 percent did not speak English "very well."

In 1990 there were 4,369 family households in Central Falls, 54.3 percent of which had children under age 18. In 1989, 18.7 percent of all families in Central Falls had incomes below the federal poverty level. That same year 22.5 percent of Central Falls residents of all ages lived in poverty, while the poverty rate for children under 18 was 32.5 percent. This child poverty rate can be compared with the rates of 18.0 percent for Providence County, 13.5 percent for the entire state of Rhode Island, and 19.0 percent for the U.S. in 1989.

As of January 14, 1994, the total public school enrollment in Central Falls was 2,763 children in grades Pre-K through 12. Of these, 1,724 were enrolled in grades Pre-K through 6. The 1,039 students enrolled in grades 7-12 all attended a single school. Data provided by the Office of School Food Services indicates only approximately thirty students in grades 7-12 participated in the SBP. Participation within grades Pre-K through 6 has held steadily at approximately 18 percent. **Due to the very low SBP participation among students in grades 7-12, those grades were excluded from this study.** Thus the population studied was all Central Falls school district students in grades Pre-K through 6.

A "Rapid Assessment" Evaluation

Since a decision was made in January 1994 to implement a UF-SBP in the Central Falls schools during the first week of March 1994, there was a very limited time between the decision to implement and actual implementation. The short time period available for designing and planning the evaluation study required that it be undertaken within a framework embodying aspects of a "rapid assessment" evaluation.[5]

The necessity to design, plan and implement an evaluation of the change from a R-SBP to a UF-SBP within such a brief time period precluded optimal selection of control group schools. Consequently, when it was determined during administration of the pre-intervention survey within control group schools that lack of enforcement of eligibility status in some control group schools resulted in effectively unlimited free participation in the SBP in those schools, it was not possible to select replacements. The technical implication of this discovery is a somewhat weakened ability to attribute changes in some variables of interest solely to the intervention (i.e., implementation of the UF-SBP in Central Falls schools).

Sample

A stratified random sample was selected from current school enrollment rosters obtained and merged by computer technicians from the Office of School Food Services in accordance with accepted sampling procedures (Kish, 1969). The sample was stratified on the basis of eligibility for free school breakfast. Since it was known *a priori* that only 25 percent of students are not eligible for free breakfasts, a decision was made to over-sample from this stratum. The sample was drawn so that one-third of the total pretest sample came from the ineligible stratum.

Once stratification was accomplished, subjects were randomly selected from each stratum according to the above stated proportions (one-third free-breakfast eligible, two-thirds not eligible). The pretest subsample size from Central Falls was 225 students. This provides a pretest sampling fraction for Central Falls of approximately 13 percent.

A control group subsample of comparable size was selected from two Providence, RI schools resembling Central Falls schools in terms of eligibility rates for free school breakfasts. The two schools chosen for the control sample have a combined enrollment in grades K-6 of 1,484 students (as of October 1993). The sample size of 225 thus leads to a control group pretest sample fraction of approximately 15 percent. The control group sample was selected in a manner identical to the procedure used for the Central Falls sample.

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[5] See Scrimshaw, N. S., and G. R. Gleason (Eds), (1992) Rapid Assessment Procedures: Qualitative Methodologies for Planning and Evaluation of Health Related Programmes, International Nutrition Foundation for Developing Countries, Boston, MA, for detailed descriptions of Rapid Assessment Procedures and the contexts in which they are required.

ANALYSIS

The data obtained from this study were analyzed according to accepted standards of scientific inquiry and statistical rigor. Responses recorded on the interview protocols were coded and entered into computer software packages for nutrient and statistical analysis. Data from respondents in grades Pre-K-2 were only analyzed at a qualitative level, and for principal between-group differences for pre- and post-test periods. Data from respondents in grades 3-6 were subjected to more detailed analytic procedures.

Quantitative intake data from respondents in grades 3-6 were entered into Food Processor II diet analysis software for initial nutrient content analysis. Resulting nutrient content data were then entered into EpiInfo and SPSS for further statistical analysis. Some preliminary analyses were also accomplished using standard spreadsheet software.

In addition to data obtained from interviews, school-level data on attendance and tardiness were obtained from the Office of School Food Services for both Central Falls and Providence schools for the 30-day period just prior to survey implementation. This data was used to assess the effects of the change to a UF-SBP on attendance and tardiness in the Central Falls schools. Statistical tests of significance of differences in attendance and tardiness rates prior to and after the change to a UF-SBP were accomplished for the Central Falls ("intervention") group.

About the Center

The Center on Hunger, Poverty and Nutrition Policy was established at Tufts University in 1990. Its purpose is to advance public policy choices which reduce hunger and poverty, and enhance the development and productive capacities of American families and children. The Center carries out policy research and analyses, and works with governmental leaders and the media to promote greater understanding of policy alternatives for the nation.

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